Listing of the Claims

1. (Original)   A method of improved coil sensitivity estimation for reducing artifacts in an MRI apparatus utilizing parallel imaging, the method comprising:

for a parallel imaging sequence, performing a calibration sequence relative to the parallel imaging sequence, using one of:

a spin echo type sequence matching the in-plane phase encode direction of the calibration and the parallel imaging sequences for each calibration; and

a gradient echo type sequence matching the in-plane phase encode direction of the calibration and the parallel imaging sequences for each calibration.

2. (Original)   The method as set forth in claim 1, wherein the calibration sequence is performed for each parallel imaging sequence.

3. (Original)   The method as set forth in claim 2, wherein the calibration sequence is performed prior to each said parallel imaging sequence.

4. (Currently Amended)   The method as set forth in claim 1, wherein the gradient echo type calibration sequence is performed with a very short echo time (TE), e.g. less than 5 ms.

5. (Original)   The method as set forth in claim 1, further including:

using an essentially identical read out gradient in both the calibration sequence and the parallel imaging sequence.

6. (Original)   The method according to claim 1, wherein a phase encode direction of said calibration sequence is essentially directed in along a phase encode direction of said parallel imaging sequence.

7. (Currently Amended)   An MRI apparatus having a sequence controller ~~(70)~~ programmed to perform the method as set forth in ~~any of~~ claims 1-6.

8. (Currently Amended)   An MRI apparatus that includes a magnet system for generating a B$_0$ magnetic field in an examination zone ~~(46)~~, the apparatus comprising:

    means ~~(58,72a,76a,...,76n)~~ for exciting and manipulating magnetic resonance in the examination zone;

    means ~~(52,74,72b)~~ for spatially encoding the magnetic resonance;

    plurality of coils ~~(76a,...,76n)~~ with differing sensitivity profiles for receiving resonance signals in parallel;

    means ~~(80a,...,80o)~~ for reconstructing received resonance signals into image representations;

    means ~~(84)~~ for generating sensitivity profiles ~~(86)~~ of the coils ~~(76a,...,76n)~~ from image representations ~~(82a,...,82n)~~ generated during a calibration scan;

    means ~~(90)~~ for generating a diagnostic image ~~(92)~~ from the sensitivity profiles ~~(86)~~ and image representations ~~(82a,...,82n)~~ generated during a diagnostic scan;

    sequence control means ~~(70)~~ for accessing a calibration sequence memory means ~~(74)~~ to retrieve one of an RF refocused spin echo type sequence and a gradient recalled echo type sequence and controlling the resonance exciting means ~~(58,72a,76a,...,76n)~~ and the spatial encoding means ~~(52,74,72b)~~ in accordance with the retrieved calibration sequence to generate resonance signals for the reconstruction means ~~(80a,...,80o)~~ to reconstruct into the calibration image representations ~~(82a,...,82n)~~ and for accessing a diagnostic imaging sequence memory means ~~(88)~~ to retrieve a diagnostic

imaging sequence and controlling the resonance exciting means (58,72a,76a,...,76n) and the spatial encoding means (52,74,72b) to generate resonance signals for the reconstruction means (80a,...,80o) to reconstruct into the diagnostic image representations (82a,...,82n).